We should probably have something good if this color could be infused into the Eucharis by inter-breeding.—Gardeners' Chronicle.

MIND AND MORALS IN ANIMALS AND SAVAGES.

By A. O'NEILL DAUNT.

WITH regard to the intelligence of ants, I take the following from Romanes. Prof. Leuckart placed round the trunk of a tree which was visited by ants as a pasture for aphides, a broad cloth soaked in tobacco water. When the ants, returning home down the trunk of the tree, arrived at the soaked cloth, they turned round, went up the tree again to some of the overhanging branches, and allowed themselves to drop clear of the obnoxious barrier. On the other hand, the ants which desired to mount the tree first examined the nature of the barrier, then turned back and procured from a distance little pellets of earth which they carried in their jaws, and deposited one after another upon the tobacco cloth till a road of earth was made across it, over which the ants passed to and fro with impunity. Romanes observes that this interesting observation of Leuckart's is a corroboration of an almost identical one made more than a century ago by Cardinal Fleury, and communicated by him to Reaumur, who published it in his "L'Histoire des Insectes," in 1734. The Cardinal smeared the trunk of a tree with birdlime in order to prevent the ants from ascending it; but the insects overcame the obstacle by making a road of earth, small stones, etc., as in the case just mentioned. The Cardinal also in another instance saw a number of ants make a bridge across a vessel of water surrounding the bottom of an orange tree tub. They did so by conveying a number of little pieces of wood, the choice of which material, instead of earth, stones, etc., as in the previous case, seems to betoken no small knowledge of practical engineering.

Büchner, as quoted by Romanes, records a similar exhibition of intelligence: The ants behaved in a yet more ingenious fashion under the following very similar circumstances. Herr G. Theuerkauf, the painter, writes to the author, November 18, 1875: "A maple tree standing on the ground of the manufacturer, Vollbaum, of Elbing (now of Dantzic), swarmed with aphides and ants. In order to check the mischief, the proprietor smeared about a foot width of the ground round the tree with tar. The first ants who wanted to cross naturally stuck fast. But what did the next? They turned back to the tree, and carried down aphides which they stuck down on the tar one after another, until they had made a bridge over which they could cross the tarring without danger. The above named Vollbaum is the guarantor of this story, which I received from his own mouth on the very spot whereat it occurred."

Of ecitons, Mr. Belt says:

"I shall relate two more instances of the reasoning faculty in these ants. I once saw a wide column trying to pass along a crumbling, nearly perpendicular slope. They would have got very slowly over it, and many of them would have fallen, but a number having secured their hold and reaching to each other remained stationary, and over them the main body passed.

"Another time they were crossing a watercourse along a small branch not thicker than a goose quill. They widened this natural bridge to three times its width by a number of ants clinging to it, and to each other, on each side, over which the column passed three or four deep; whereas, excepting for the expedient, they would have had to pass over in single file, and treble the time would have been consumed. Can it be contended that such insects are not able to determine by reasoning powers which is the best way of doing a thing?"

When ants have to cross a stream too wide for branches to span, they use chips of wood as rafts, and these are joined together by a chain of ants which hold on to each other till the strain from the stream becomes unequal to their strength. These sections continue their voyage, the ants on the shore meantime constantly launching fresh rafts, which are built up into sections and manned, shoved off, and are again broken up in the same manner. Thus the process continues until the whole body of the insects has crossed the water.

Dr. Lincecum writes as follows of the ant farms:

"There can be no doubt of the fact that the particular species of grain-bearing grass mentioned above is intentionally planted. In farmerlike manner, the ground upon which it stands is carefully divested of all other grasses and weeds during the time it is growing. When it is ripe, the grain is taken care of, the dry stubble cut away and carried off, the paved area being left unencumbered until the ensuing autumn, when the same 'ant rice' reappears within the same circle, and receives the same agricultural attention as was bestowed upon the previous crop—and so on, year after year, as I know to be the case in all situations where the ants' settlements are protected from graminivorous animals."

In a subsequent letter to Darwin, Dr. Lincecum further says: "I have not the slightest doubt of it (i. e., that ants plant seeds for a crop), and my conclusions have not been arrived at from hasty or careless observations, nor from seeing the ants do something that looked like it, and then guessing at the results. I have at all seasons watched the same ant cities during the last twelve years, and I know what I stated in my former letter is true. I visited the same cities yesterday, and found the crop of ant rice growing finely, and exhibiting also the signs of high cultivation, and not a blade of any other kind of grass or weed was to be seen within twelve inches of the circular row of ant rice."

Romanes, after alluding to Pliny's assertion that certain ants in the south of Europe practiced the strange habit of interring their deceased friends, quotes the following account of an observation by Mrs. Hutton, who, having killed several soldier ants, returned half an hour afterward to the place where the bodies were lying, and thus describes what she saw:

"I saw a large number of ants surrounding the dead ones. I determined to watch their proceedings closely. I followed four or five that started off from the rest toward a hillock a short distance off in which was an ants' nest. This they entered, and in about five minutes they reappeared, followed by others. All fell into rank, walking regularly and slowly two by two, until they arrived at the spot where lay the dead bodies of the soldier ants. In a few minutes two of the ants advanced and took up the dead body of one of their comrades; then two others, and so on, until all were ready to march. First walked two ants bearing a body, then two without a burden, then two with another dead ant, and so on till the line was extended to about forty pairs, and the procession now moved slowly onward, followed by an irregular body of about two hundred ants. Occasionally the two laden ants stopped, and laying down the dead ant, it was taken up by the two walking unburdened behind them, and thus by occasionally relieving each other, they arrived at a sandy spot near the sea.

"The body of ants now commenced digging with their jaws a number of holes in the ground, in each of which a dead ant was laid, where they now labored on until they had filled up the ants' graves. This did not quite finish the remarkable circumstances attending the funeral of the ants. Some six or seven of the ants had attempted to run off without performing their share of the task of digging; these were caught and brought back, when they were at once attacked by the body of ants and killed upon the spot. A single grave was quickly dug, and they were all dropped into it."

This evidence of intelligent action on the part of ants might be extended indefinitely did space permit. It is not necessary to take each link in the zoological chain, and to study the evidence afforded by it in favor of the contention that the minds of animals, as exhibited by their actions, appear to be essentially the same in kind as that of man. A few examples taken at random will suffice. As so much has been written of the intelligence of the dog, I shall not notice this animal, but only such as live in natural freedom.

In Vol. VIII. of the "Miscellaneous Publications of the United States Geological Survey," Captain Elliot Coues thus describes the ingenuity of the wolverine:

"At Peel's River on one occasion a very old carcajou discovered my marten road (i. e., line of traps set for martens), on which I had nearly a hundred and fifty traps. I was in the habit of visiting the line about once a fortnight, but the beast fell into the way of coming oftener than I did, to my great annoyance and vexation. I determined to put a stop to this thieving and his life together, cost what it might. So I made six strong traps at as many different points, and also set three steel traps. For three weeks I tried my best to catch the beast without success, and my worst enemy would allow that I am no green hand in these matters. The animal carefully avoided the traps set for his own benefit, and seemed to be taking more delight than ever in demolishing my marten traps, and eating the martens, scattering the poles in every direction, and caching what baits or martens he did not devour on the spot. As we had no poison in those days, I next set a gun on the bank of a little lake. The gun was concealed in some low bushes, but the bait was so placed that the carcajou must see it on his way up the bank. I blockaded my path to the gun with a small pine tree, which completely hid it. On my first visit afterward I found that the beast had gone up to the bait and smelled it, but had left it untouched. He had next pulled up the pine tree that blocked the path, and gone around the gun and cut the line which connected the bait with the trigger, just behind the muzzle. Then he had gone back and pulled the bait away, and carried it out on the lake (i. e., on the ice), where he lay down and devoured it at his leisure. There I found my string. I could scarcely believe that all this had been done designedly, for it seemed that faculties fully on a par with human reason would be required for such an exploit, if done intentionally. I therefore rearranged things, tying the string where it had been bitten. But the result was exactly the same for three successive occasions, as I could plainly see by the footprints; and what is most singular of all, each time the brute was careful to cut the line a little bit back of where it had been tied before, as if actually reasoning with himself that even the knots might be some new device of mine, and therefore a source of hidden danger he would prudently avoid—I came to the conclusion that that carcajou ought to live, as he must be something at least human, if not worse. I gave it up, and abandoned the road for a period."

This curious animal has the singular habit of shading his eyes with one of his forepaws when carefully scrutinizing an object at a distance.

I must now say a few words on the moral sense of animals. I have already adverted to the fact, which has been frequently observed to occur, that animals are capable of risking and even sacrificing their lives in the service of others. Why should we, when we behold an instance of this disinterestedness, ungenerously ascribe it to any lower impulse than we should in the case of a similar act on the part of a human being? It is "instinct" we are told; and we are further told that instinct arises as the mechanical result of millions of actions of the same kind in the life history of the species. A moment's reflection will show the absurd inappropriateness of this explanation of such actions, not to speak of the insufficiency of such a theory of the origin of instinct. In general, where animals exhibit unselfishness, courage in facing danger to aid others, make intercession in combat, show conciliation and love of knowledge and hospitality, evince interest in the proceedings of their fellows or of man, and sympathy in their sufferings, seem actuated by a sense of duty, and show a sense of personal merit for actions worthily performed, a selfish end for these manifestations is too often asserted to be the motive. But before we judge animals thus harshly, let us reflect that in similar cases man himself no less frequently (and, I believe we may assume, much more frequently) is actuated by selfish and interested personal ends. Lindsay says that animals possess a sense of right and wrong, with a power of choice between them; that they commit crimes and are aware of the criminality of their acts; that they have a wonderful power of self-control, and possess not only a moral, but even a religious sense (presumably meaning a sense of reverence), including a conscience. They also have a knowledge and dread of consequences; can deliberate and decide on proposed courses of conduct; have freedom of will and the faculty of voluntary action. They can balance or weigh present or immediate pleasures against prospective pains; appreciate rewards or punishments; perceive and correct ther own mistakes, as well as frequently those of man; have a knowledge of duty and of trust. From these attributes he infers the possession of a sense of responsibility, which is realized by all those who base their system of training and education of animals on rewards and punishments. This possession of responsibility appears to have been understood by the Jews, according to whose law (Exodus xxi., 28–32) an ox that had gored a man or woman was condemned to be stoned to death. Draper states that a horse, which had been taught many tricks by its master, was adjudged to be burnt to death at Lisbon 1601, as being possessed by the devil. During the middle ages similar instances of animal execution for crime were numerous. Sometimes even animals had to pass through the ordeal of combat, a champion being assigned to them. Pierquin says that dogs have been accepted as witnesses in courts of justice. It is well known that man has often trained dogs to act as his accomplices in crime, and by a perversion of justice, the animal has been condemned to death and his more guilty owner allowed to go free.

Innumerable instances could be quoted to show the love of animals for their offspring, their self-abnegation for the advantage, comfort, or preservation of their young. In this alone how often they set example to man, who even in civilized communities so far falls short of them in this virtue as to render necessary the establishment of protection societies for children in our chief towns and cities. The late Lord Beaconsfield said that infanticide was as common in England as upon the banks of the Ganges. In fidelity and unswerving affection of the most unselfish kind, what an example have we in the dog! Sometimes this is equally observable in women; seldom in a man. What a religious moral, too, may be drawn from this devotion of the animal to his master, who is his god! Would that man with his boasted pre-eminence would imitate his humble friend, and evince a like devotion and love toward his God!

It is now necessary to turn from animals to man, and to consider what are his characteristics as visible in the savage state, and how the outcome of his "reason" compares with that of the intelligence of animals. In the first place, let us inquire what amount, if any, of religious sense actuates a low type of savage. Lindsay says that missionaries, traders, or travelers in various parts of the world, as well as naturalists, who are closer observers, inform us that there are, or were, certain savage races utterly destitute of any religious sense whatever, having apparently no idea of personal responsibility, no sentiment that could be characterized as religious, no form of worship, and no observance. The Rev. William Colenso, of Napier, New Zealand, says that the Maoris had no form of religious worship, and that whether we define religion as reverence toward God, or as a form of fear of future punishments, or as a hope of reward, they equally were devoid of it; the idea was wholly absent from their minds. God was not to them even a vague abstraction; they knew nothing of Him; they did not even practice idolatry, having no idols. They paid no worship to any object evident to their senses, neither to the sun, moon, stars, nor to any personification of natural forces. Another writer quoted by Lindsay says of them: "The great fact observable from a consideration of their traditions . . . . is that the people had no idea of a Supreme Being, the Creator of all things in heaven and in earth." These observations are accurately descriptive of many other savage tribes in various countries. It is apparently true that while among some savage peoples an idea, however dim, which might be described as religious prevails more or less, there yet are other peoples so low in the scale of intellectual development as never to have formulated any kind of theory of a religious character. When Moffatt, the well known South African missionary, first visited the Bechuanas, he found that they had absolutely no idea of a God, nor had they any conception of a future state. They had not even any idols, and on one being shown to a chief as the object of adoration by other men, he could not repress his amazement, observing that he did not understand how anyone could be found foolish enough to worship an article made by his own hands. This total absence of a religious sense was also noticed by Dr. Livingstone among the Makondes in the Rovuma country. "They knew nothing," he says, "of a deity; they pray to their mothers when in distress; they know nothing of a future state, nor have they any religion except a belief in medicine. They blame witches for disease and death. . . . They fear the English." Dr. Nixon, Bishop of Tasmania, says that he was obliged to desist from all attempts at conversation because the poverty of the native language, and of their conceptions, was such as rendered every higher religious idea impossible to them. The Andaman Islanders are described as similarly destitute of the religious sense, Jesuits and Moravians having both failed to impress them. Sir Samuel Baker gives a like character to the natives of the Albert N'yanza region, where he was informed by the head of the Austrian Mission that "the mission was absolutely useless among such savages." In other portions of Africa the same observations have been made. At Dahomey the natives have no conception of God, neither have they any belief in future rewards or punishments. Baker and Hartshorne state that the Veddas of Ceylon are wholly ignorant of the existence of God, of the soul, of life after death. Yet in this instance there appears a faint trace of some superstition connected with death, as they make an offering to a deceased friend; but whether it be simply a mode of commemorating him does not appear.

Another authority, who had the advantage of observing them personally, expresses the belief that they know nothing whatever of anything having a religious significance. The same ignorance prevails among the Angolese. Of King Kamrasi, in the N'yanza region, Baker observes that "in this wild, naked savage there was not even a superstition on which to found a religious belief."

It is needless to adduce testimony from the many regions on the globe in which this dense ignorance exists, in order to show that man in the natural state is not necessarily informed by his reason of his personal responsibility to a Supreme Being for his actions in this life, and of a state of reward or punishment in the next proportionate to his merits. Let us rather view him in his social relations, and try to ascertain whether his limited intelligence differs in kind from that of the animals by which he is surrounded.

Buchner, writing of certain aborigines of Borneo, says that they are destitute of an articulate language of their own, and only learn with difficulty to pronounce a few Malay words.

Much of the language of certain tribes, such as the natives of the Philippines and the bushmen of South Africa, consists largely of inarticulate sounds, clicks, facial grimaces and gestures. When wishing to converse at night, a traveler states that it is necessary for them to halt and make a fire in order that by its light this gesture language may be read. The Apache also communicates rather by gesture than by sounds.

It is said that the language in use among the Fanns of West Africa is so little like human speech that that term is inapplicable to it.

With regard to the mental status of the savage, there appears to be a consensus of opinion that certain races are unimprovable, incapable of progress. For thousands of years the ape men of India have lived in trees, and they still do so in common with monkeys. The Bukones live on a framework or platform of sticks among the branches of the trees, the construction very much resembling the roost of the anthropoid apes. The Veddas live like the animals, anywhere or anyhow. No progress has taken place among such races, nor do they seem capable of it.

Some savages are incapable of counting to five, many cannot count to ten. Countless tribes go naked, having no sense of modesty. When the Ladrone Islands were first visited by the Spaniards, the natives were ignorant of the use of fire. Many tribes or nomadic parties do not cook their food, eating their meat raw. Others are known to eat dirt, ordure, carrion; parturient mothers devour their own placenta.

Cannibalism is well known to be practiced by certain tribes; some eat their own children or other relatives. The Uaupes disinter their dead, burn them, and swallow the ashes. Personal cleanliness is as little known among many savages as among some animals. Filial affection is unknown. A father having died during the night, his sons heaved his body over the camp fence to the hyenas, and next morning amused themselves by kicking the skull round the kraal like a football. Gorging and sleeping are all the ideas of happiness formed by a bushman of South Africa.

Savages are also characterized by an absence of even the most ordinary foresight, although continually suffering from the want of it. The Caribs formerly possessed no appliances for fishing. The Mincopies or Andaman Islanders have hardly any tools; the Abyssinian Dokos possess no weapons. Some savages tear off the husk of cocoanuts with their teeth, using hands and feet to hold the nut like a monkey. Doko mothers are said to suckle their children but for a short time, abandoning them without scruple. This practice has also been observed among some of the natives of Australia. Richerer accuses the bushmen in South Africa of smothering or strangling their children when there is scarcity of food. Some of the Indians in Northwestern America allow their aged to die of hunger for the same reason. Buchner says that in New Caledonia the aged are buried alive.

Many savages evince no respect for the dead, nor have they any rites of interment. Veddas seem unable to distinguish between colors. The animal faculties of keenness of scent, sight, hearing, sense of direction, are highly developed. Lindsay says that so stupid are some of the aborigines of Australia and Borneo, that they are unfit to be used as slaves. He quotes testimony to show that the Mincopies are untamable, and states that among the Veddas memory is almost wholly absent, instancing that a man could not even remember the name of his wife until he happened to see her, when he mechanically uttered it. He ascribes to the lower types of savages in general, incapacity of generalization, want of originality, ignorance of arithmetic, absence of idea of time, of the idea of knowledge, of legislation, of social laws or regulations, want of the idea of property among some Australians; ignorance of history; want of policy or plans of action, of government, as among the Dokos, of commerce, of agriculture, of any industry, of money or its equivalent, of arts, absence of laughter, as in the Veddas, of facial expression as in the Digger Indians and Botocudos, of specific language as in the Mincopies, hence of conversation, of salutations, as in the Apaches. In beings such as these the reasoning faculty seems to be in abeyance. Their social and intellectual status compares unfavorably with that of ants or bees; their morals are below those of anthropoid apes, or animals in general. The animal mother defends her offspring at every cost; the human savage mother, to avoid a little inconvenience, puts it to death. The animal detects incapacity in its young to feed itself (as happens in cases of imbecility), and supplies it specially with food, as has been noticed by Houzeau; man would not often determine the cause. A writer instancing the stupidity of the Africans in British Guiana says that their natural stupidity borders so nearly on imbecility, dementia, and amentia that it is difficult to say where a normal state ends and an abnormal one begins. There is hardly a condition of the animal mind which has not its analogue in that of man. Every cause which arouses mental activity in the animal is evidenced in the same manner in man; such incentives as grief, joy, pain, and hope, fear, love, reverence, gratitude, honesty, sense of trust, obedience, love of offspring, caution, the musical sense, anger, suspicion, revenge, sense of humor, and many others, produce action in animals identical with the results in man. Animals possess will, memory, understanding, exhibit purely instinctive and reflex actions as does man; fear death, and have often been credited with superstitious terror. Aquinas expresses the opinion that animals have souls, which, however, he gives them in common with plants, but to which he denies immortality.

With regard to this limitation it is only necessary to say that we can believe it when we find a single instance of anything which, having once come into being, ceases to be. It is against all analogy in Nature. Are we to admit immortality, unending existence, for the ultimate elements of the animal body, the inferior part, and deny it to the soul, the vital principle, the superior part, for which the former merely serves as the habitation. It would then appear that the evidence furnished in the case of man for the possession by animals of a mind only differing from the intelligence of the human in degree and not in kind must be held also to infer their possession of a soul. If this be so, and I do not know of any more valid objection to it than theological prepossessions and prejudices, we must be prepared to consider the question of the rights of animals from a new and advanced standpoint. However this may be, I think an impartial review of the evidence for the identity in kind of the animal and human mind, especially in the light afforded by the doctrine of evolution, must satisfy any but the irreconcilably prejudiced. The subject is a vast one, and I have, I fear, done it scant justice; but I trust I have said sufficient to show that it is not one which can be regarded as closed by the decisions of certain old-fashioned authorities.—The Humanitarian.

THE NEW AUTOMATIC PISTOL OF THE GERMAN ARMY.

FOR the arming of its officers, Germany has just brought into service a new ordnance pistol with a central magazine, and which is much superior to all weapons of the kind known, especially to the revolver. It is capable of firing ten shots in succession.

The loading is done automatically through a utilization of the force of recoil and a new application of the principle already brought into play in the Maxim gun and in the rapid-fire artillery.

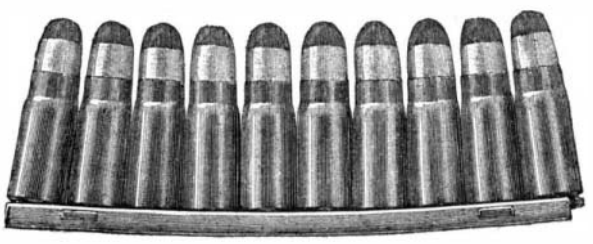

FIG. 2.—LOADER CONTAINING TEN CARTRIDGES.

After each shot, the movable breech piece, pushed backward, causes the operation of: 1, an extractor that removes the empty shell; 2, a carrier that brings a new cartridge opposite the breech; 3, a hammer that is cocked for the next shot; and 4, a spring which, in relaxing, pushes home the cartridge presented by the carrier.

In order to fire the pistol, the marksman has merely to press the trigger; and in doing this, does not tire his finger in order to effect any maneuver, as he would in the case of a revolver, in which the barrel is controlled by the trigger.

In Fig. 1 the pistol is represented upon a slightly reduced scale. The magazine, which is in the center of the weapon, forms a rectangle in which the ten cartridges are so arranged that one laps slightly over the other, so as to save space. The cartridges are introduced by hand through an aperture located above.

Each series of ten cartridges is contained in a loader consisting of a metallic plate the edges of which are provided with grooves that hold the shells through their flange.

When the breech is open, it suffices to introduce a loader into the aperture in order to provide the magazine with its ten shots. It takes no longer to perform this operation than it does to introduce one cartridge into an ordinary weapon.

Finally, a combination which is as simple as it is ingenious permits of the instantaneous conversion of the pistol into a carbine by utilizing its case as a butt-end. This case, which is of wood, has the external form of the butt-end of a gun. Fig. 3 shows the aspect of the case with the pistol inclosed, and Fig. 4 shows the pistol mounted as a carbine, with its case affixed as a butt-end.

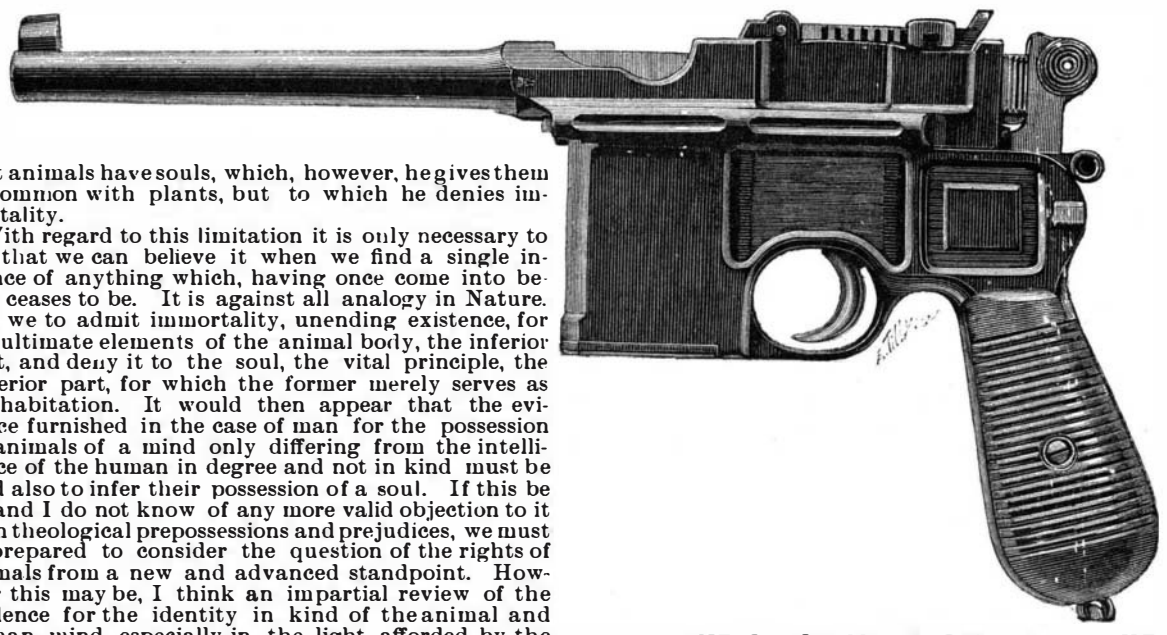

FIG. 1.—NEW AUTOMATIC PISTOL OF THE GERMAN ARMY.

The loader is represented of actual size in Fig. 2. The ball, which is of hardened lead, weighs 83 grains. Beneath its conical tip it is provided with a ring of lead alloyed with nickel. The caliber is 0·3 inch. The initial velocity of the projectile is 1,395 feet. At 33 feet, the ball passes through a spruce target 10¾ inches in thickness, and at 490 feet, a target about 5 inches in thickness. At 980 feet, it passes through a human arm in shattering the humerus and making a section of about three inches in the lumbar region of a second cadaver. The breech sight is graduated up to 1,640 feet, and the extreme range is a little over 3,000 feet.

FIG. 3.—THE PISTOL IN ITS CASE.

For the above particulars and the engravings we are indebted to L'Illustration.

The number and variety of barrels required in the different industries of the United States would astonish any one not familiar with this branch of manufacture, says The American Exporter. Barrels are now made from paper, from broad sheets or thick veneer of wood, and compete for the preference of the market with those made of wooden staves for the storage and shipment of dry materials. Paper barrels are made from a single sheet of straw-board curved to a cylindrical shape and held together with metal fasteners. Some paper barrels are made without a joint by a machine which, by centrifugal motion, throws the soft paper pulp against a mould. Steel barrels are used for the shipment of oil and gasoline, and a wood pulp barrel in which the pulp has been

FIG. 4.—THE PISTOL MOUNTED AS A CARBINE, WITH ITS CASE AS A BUTT-END.